

Gymnázium Sv. Moniky, Prešov

Wall-E



Technická dokumentácia

OnStage

Gymonika

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Všetky roboty

Na zrekonštruovanie našich robotov sme použili:

- 2 kontrolné jednotky **LEGO® Technic Veľký Hub pre SPIKE Prime**
 - Robot využíva kocky SPIKE na realizáciu autonómnych úloh. Kocky medzi sebou komunikujú prostredníctvom Bluetooth technológie, čo umožňuje synchronizáciu ich pohybov a zdieľanie informácií v reálnom čase. Každá kocka má svoju špecifickú úlohu, ktorú vykonáva, a ak je potrebné, odovzdáva informácie ďalšej kocke, aby robot vedel, kde sa nachádza alebo aký je stav jeho pohybového systému.
- **Cutebot** - Micro:bit inteligentné pretekárske auto V3
- 2 jednotky BBC **micro:bit**

Súčiastky:

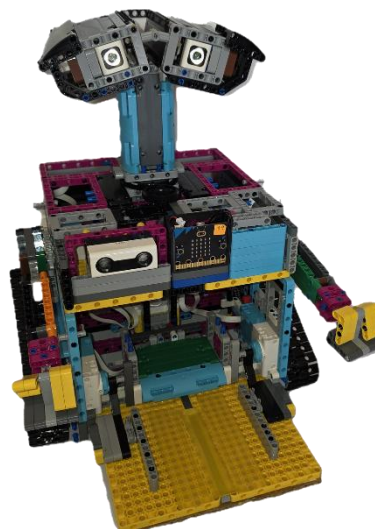
- LEGO Education SPIKE Prime Základná súprava
- LEGO Education SPIKE Prime Doplnkovou súpravou
- LEGO Mindstorms Rozšírenie pre EV3
- LEGO Mindstorms EV3 Core Set

Využili sme:

- LEGO® Education SPIKE Prime Veľký motor
- LEGO® Education SPIKE Prime Stredný motor
- LEGO® Technic Senzor farby
- LEGO® Technic Senzor vzdialenosti

Programovanie:

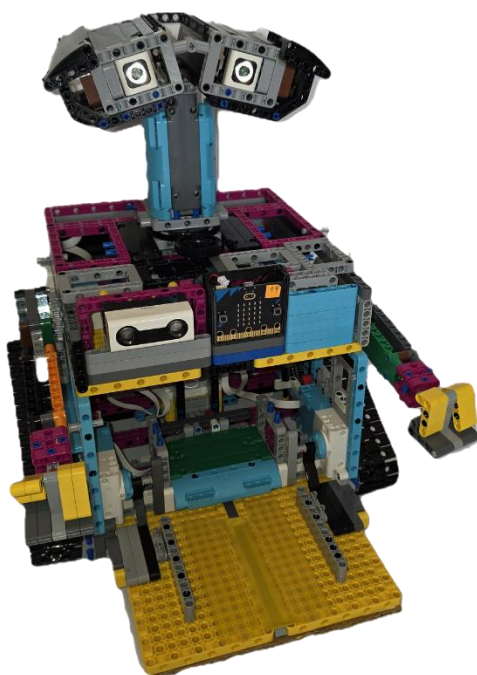
Pre účely komunikácie medzi kockami sme museli odstrániť pôvodný softvér LEGO Education Spike Prime a nahradiť ho novým programom z aplikácie Lego MINDSTORMS.

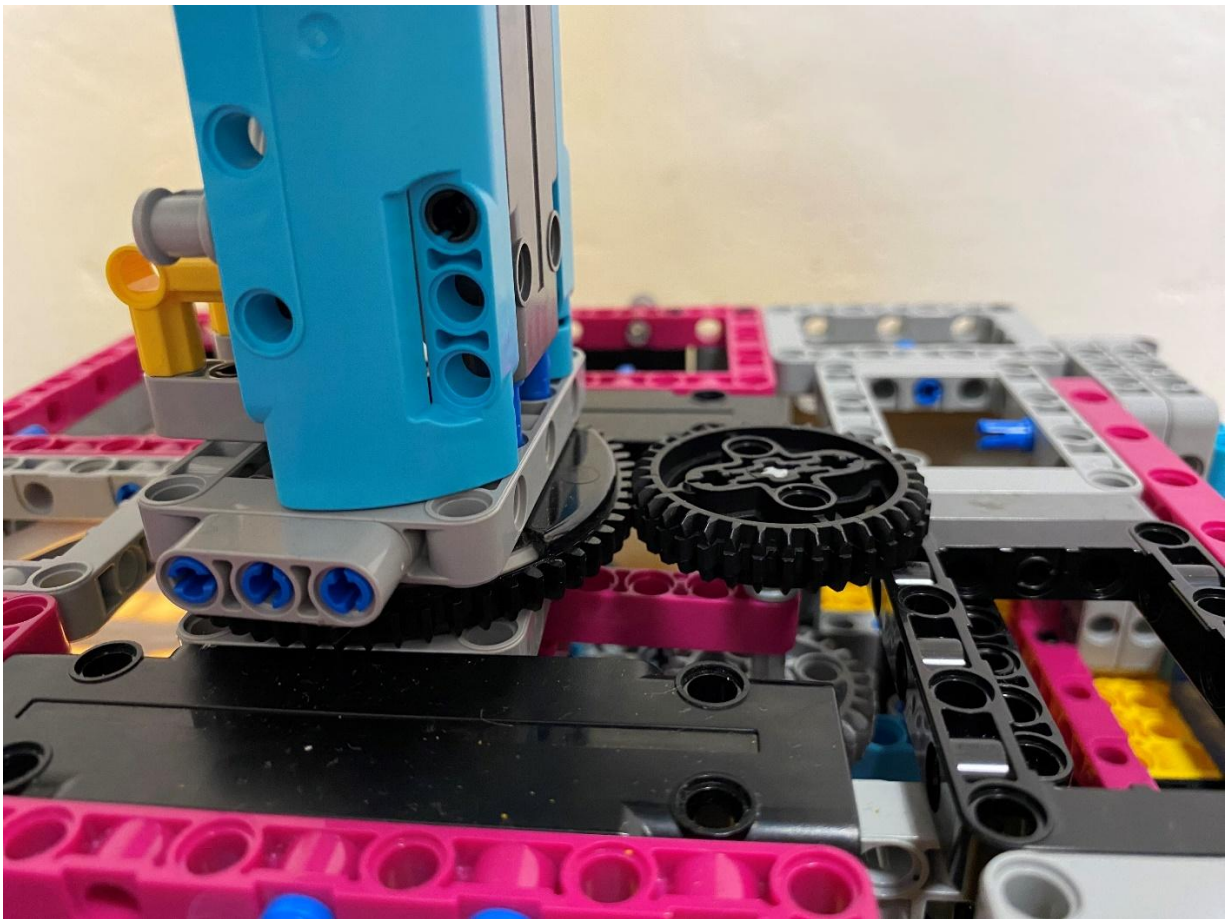
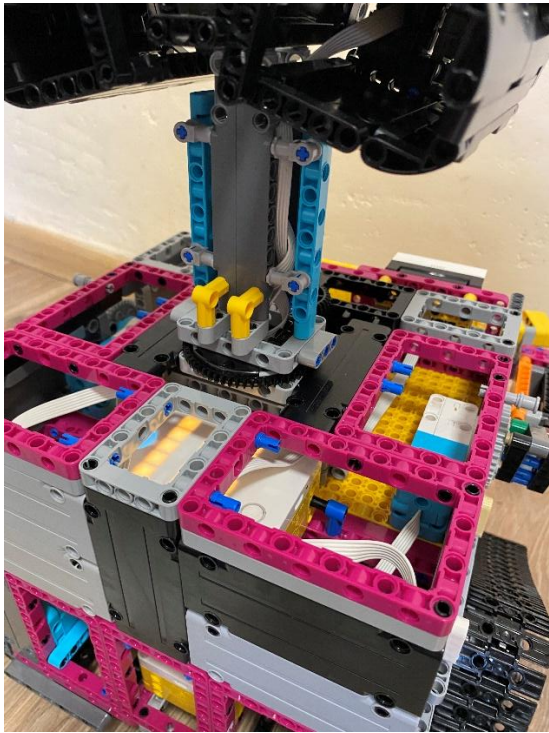


Wall – E

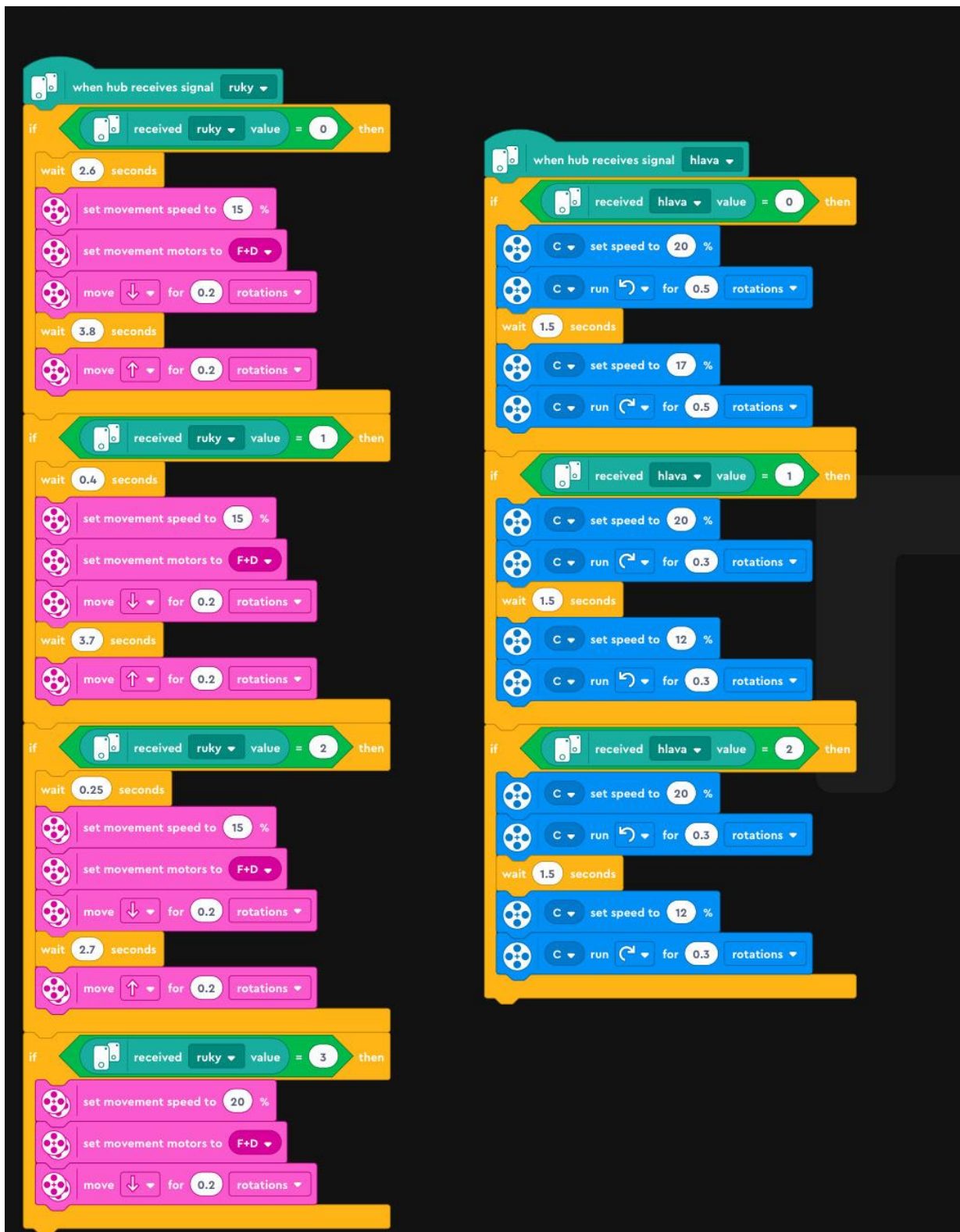
Zloženie a použitie robota:

- **2 × kontrolné jednotky SPIKE Prime LEGO Education**
 - Pohyb hlavného robota
 - Programované v LEGO Mindstorms
- **2 × LEGO® Education SPIKE Prime Veľký motor**
 - Pohyb dverí na robotovi
- **2 × LEGO® Education SPIKE Prime Veľký motor**
 - Pohyb nôh (pásy) robota
- **2 × LEGO® Education SPIKE Prime Stredný motor**
 - Pohyb rúk robota
- **1 × LEGO® Education SPIKE Prime Stredný motor**
 - Pohyb krku – otáčanie
- **1 × LEGO® Technic Senzor farby**
 - Detekovanie farby
- **1 × LEGO® Technic Ultrazvukový Senzor vzdialenosti**
 - Signalizáciou ruky začne hrať zvuk
- **1 × BBC micro:bit**
 - Odoslanie signálu do druhého micro:bitu na zapnutie programu Cutebota





Program – robot – 1. kocka:

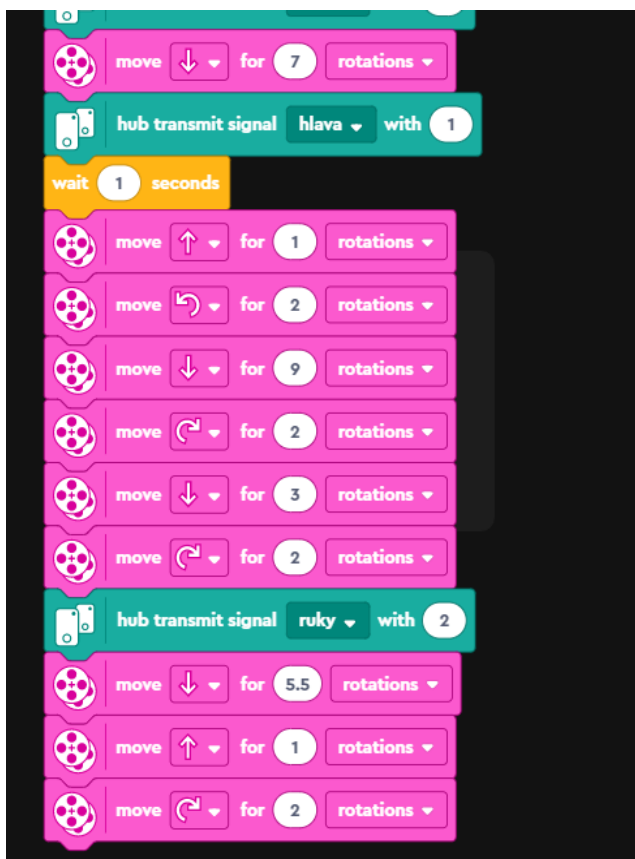
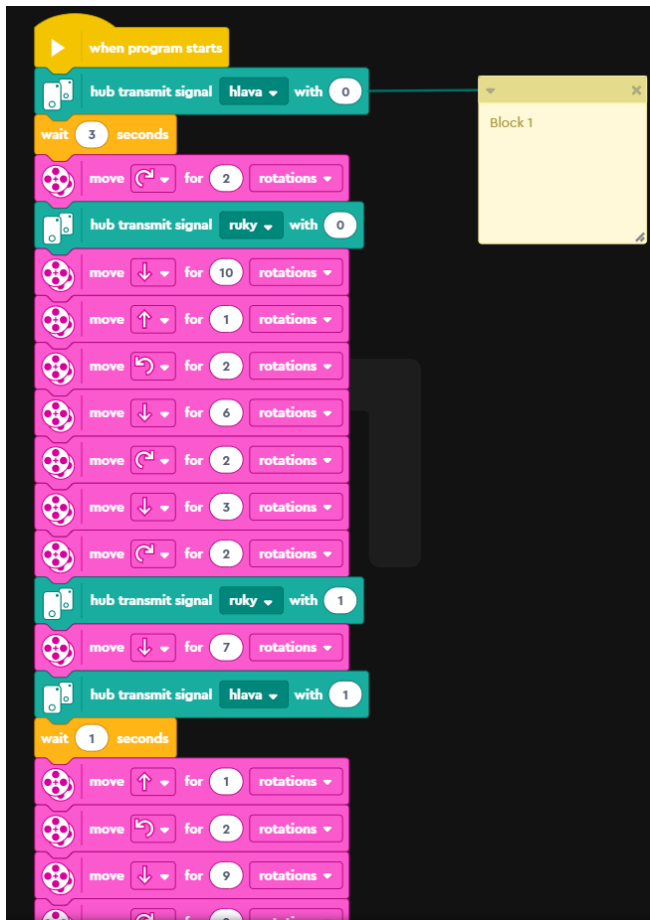


```
when hub receives signal Tanec-hlava
if received Tanec-hlava value = 0 then
  C set speed to 25 %
  C run for 0.15 rotations
  C run for 0.15 rotations
if received Tanec-hlava value = 1 then
  C set speed to 25 %
  C run for 0.15 rotations
  C run for 0.15 rotations

when hub receives signal Tanec-ruky
if received Tanec-ruky value = 0 then
  D set speed to 20 %
  D run for 0.2 rotations
  wait 1.5 seconds
  D run for 0.2 rotations
if received Tanec-ruky value = 1 then
  F set speed to 20 %
  F run for 0.2 rotations
  wait 1.5 seconds
  F run for 0.2 rotations

when B is closer than 5 cm ?
  hub transmit signal Sensor with 0
```


Program – robot – 2. kocka:




```

when hub receives signal Sensor
wait until received Sensor value = 0
play sound Walle until done
wait 0.5 seconds
play sound Awhhh until done
wait 1 seconds
hub transmit signal hlava with 2
set movement speed to 80 %
move ↓ for 7 rotations
move ↻ for 2 rotations
move ↓ for 5 rotations
set movement motors to C+F
set movement speed to 20 %
move ↑ for 0.7 rotations
play sound Tadaa until done
wait 3.5 seconds
set movement speed to 30 %
set movement motors to A+B
move ↑ for 3 rotations

```

Dance

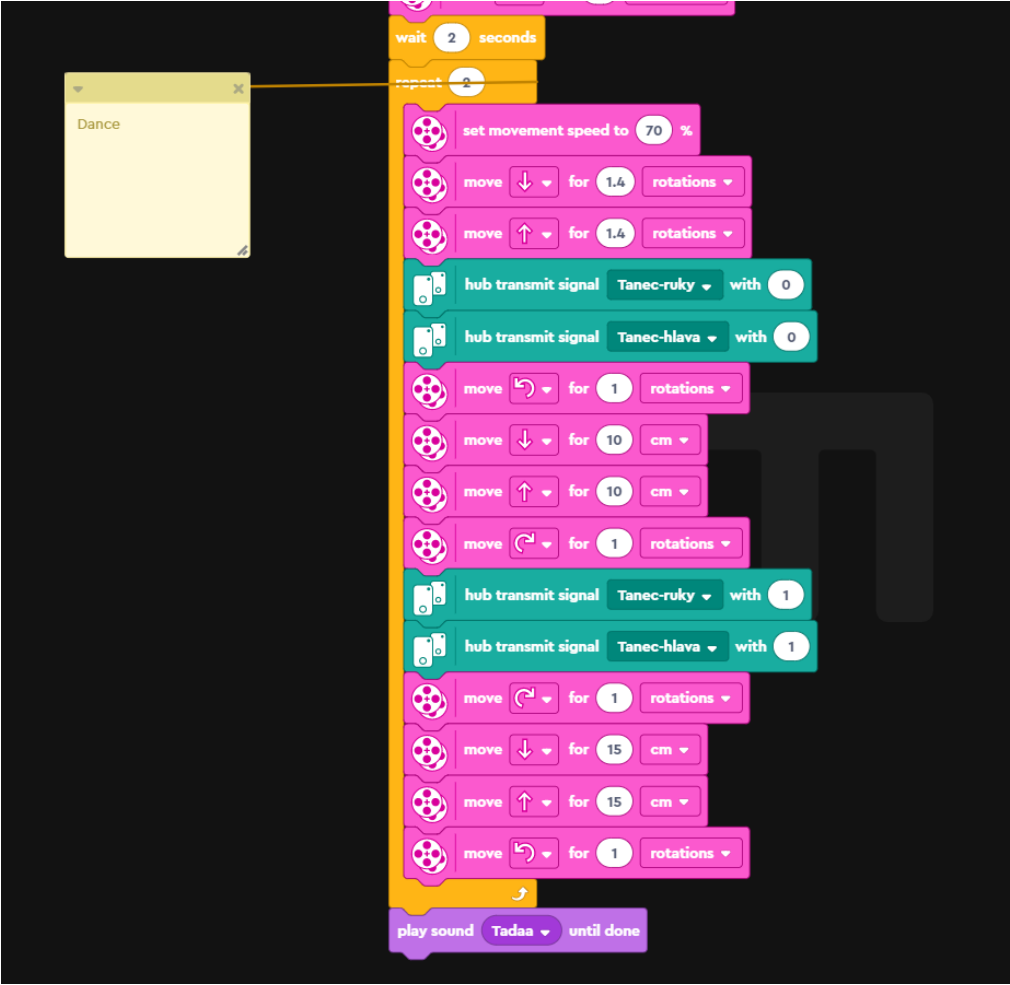
Dvere

```

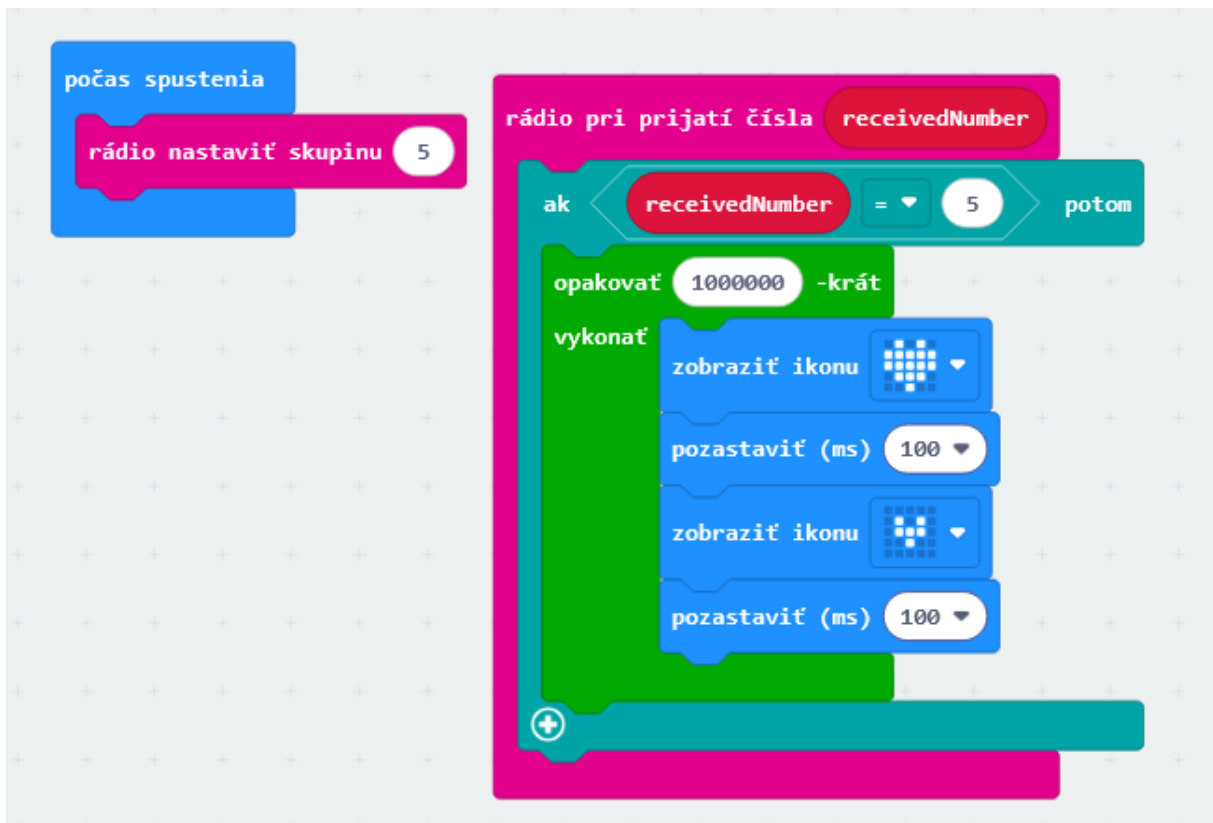
set movement motors to A+B
move ↑ for 3 rotations
set movement motors to C+F
set movement speed to 7 %
move ↓ for 1 rotations
set movement motors to A+B
set movement speed to 50 %
move ↻ for 2 rotations
wait 2 seconds
set movement speed to 70 %
move ↓ for 1.4 rotations
move ↑ for 1.4 rotations
hub transmit signal Tanec-ruky with 0
hub transmit signal Tanec-hlava with 0
move ↻ for 1 rotations
move ↓ for 10 cm
move ↑ for 10 cm
move ↻ for 1 rotations

```

Dance



Program – micro:bit – srdce Wall-E:



Rastlinka života

Zloženie a použitie robota:

- **Cutebot** - Micro:bit inteligentné pretekárske auto V3
- 2 jednotky BBC **micro:bit**

Ostatné prvky:

3D prvky – Topánka vytlačená na 3D tlačiarňami



Program- micro:bit – Rastlinka:

The code starts with a 'počas spustenia' (when started) block containing three actions: 'Set LED headlights ALL color' (green), 'rádio nastaviť skupinu 5' (radio set group 5), and 'pozastaviť (ms) 10000' (wait 10000 ms). A 'vždy' (always) loop contains a 'volanie line_tracking' (call line_tracking) block. The 'line_tracking' function is defined with three 'ak' (if) conditions based on the 'Tracking state is' sensor. The first condition (state 0) sets left wheel speed to 35% and right to 5%. The second condition (state 1) sets left to 5% and right to 35%. The third condition (state 2) sets both to 15%.

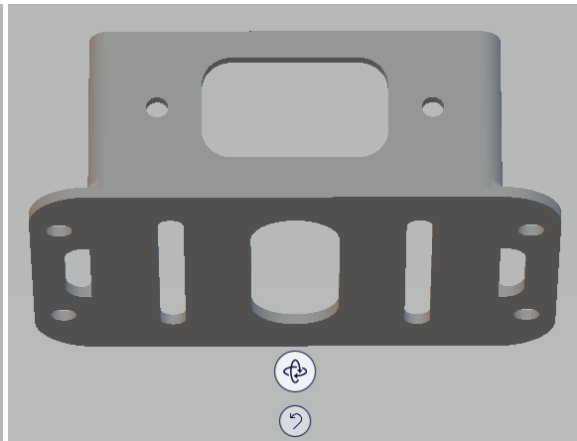
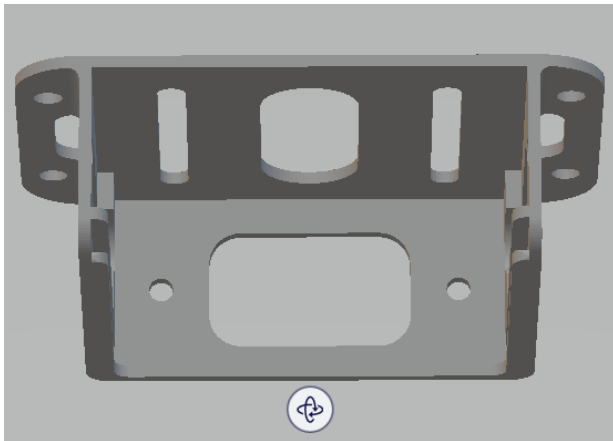
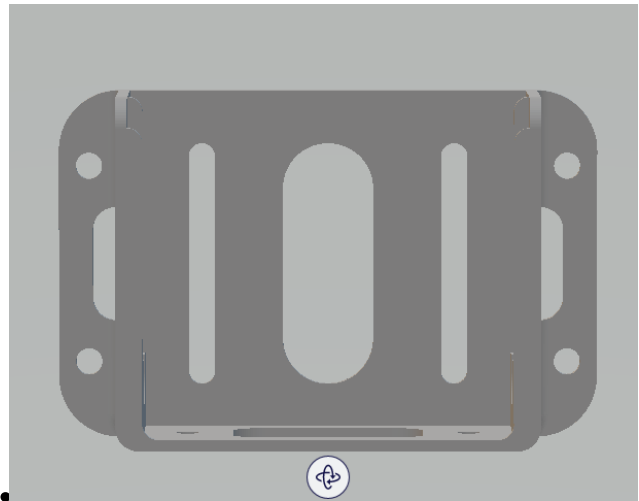
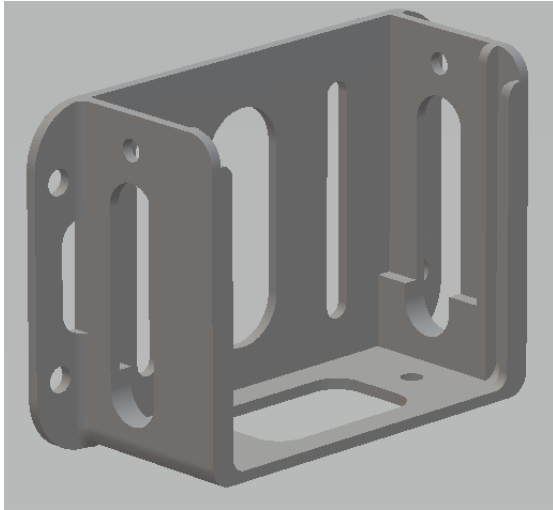
This code block is a 'vždy' (always) loop. It begins with 'pozastaviť (ms) 2000' (wait 2000 ms) and 'nastaviť sonar na HC-SR04 Sonar unit cm' (set sonar to HC-SR04 Sonar unit cm). An 'ak' (if) condition checks if 'sonar >= 0.5' and 'sonar <= 20'. If true, it sets both wheel speeds to 0%. If false ('inak'), it sets both wheel speeds to 60%. The 'inak' branch also includes 'rádio odoslať číslo 5' (radio send number 5), two 'zobraziť ikonu' (show icon) blocks, and two 'pozastaviť (ms) 100' (wait 100 ms) blocks.

Kulisy



9D.Prvky

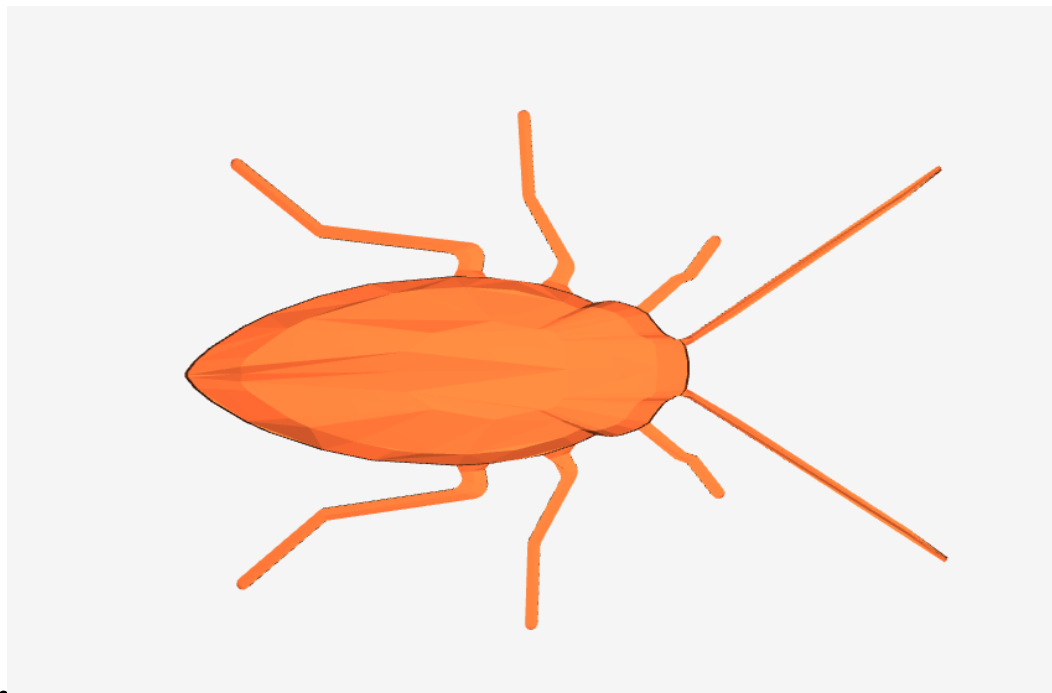
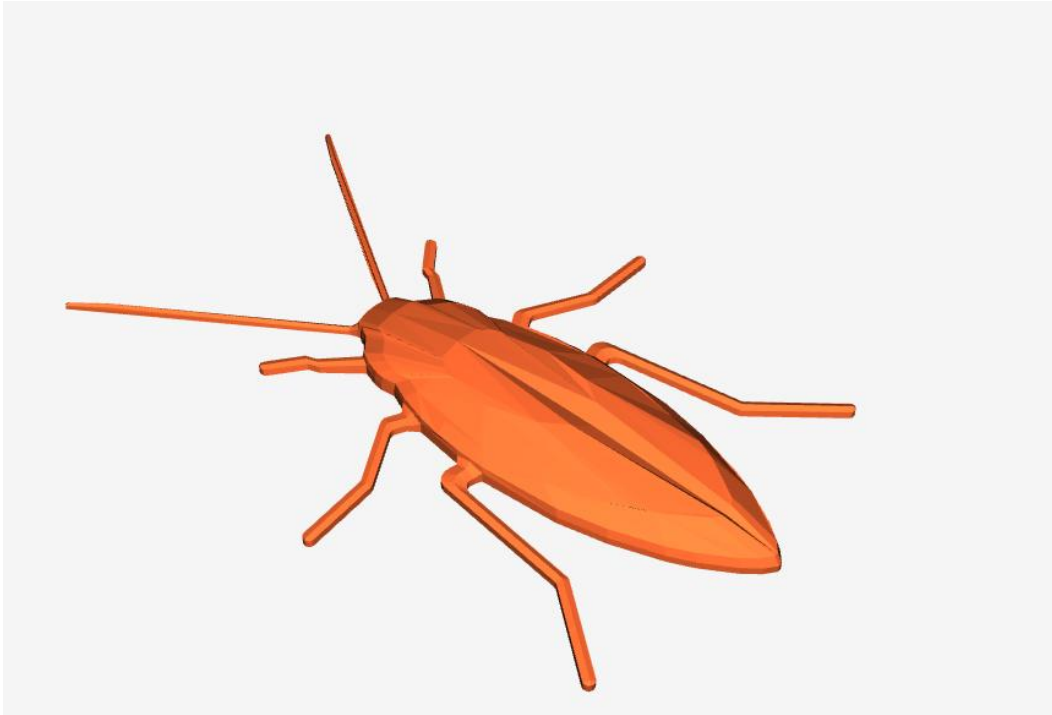
- Micro:bit obal



- Topánka



- Šváb



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